



## DATA SHEET

Scalable. Responsive. Innovative.

# Exos X12

Seagate manufactures hard drives that specifically address the needs of the hyperscale storage market. As the flagship of the Seagate® X class, the Exos™ X12 enterprise hard drive is the highest-capacity hard drive in the fleet.



## Scales to Meet Your Growing Capacity Needs

Seagate Exos X12 enterprise hard drives offer the highest rack space efficiency—up to 10PB of data in a single 42U rack. Enhanced caching makes it perfect for Big Data applications, providing the fastest hard drive data transfers in the datasphere. Hyperscale SATA models are tuned for large data transfers, providing low latency. You can easily customize your bulk storage requirements with innovative technology advancements (PowerBalance™, PowerChoice™ and RAID Rebuild®). Exos X12 drives help provide low data center TCO, and are architected to offer low power and weight. Simplified infrastructure management is possible with FastFormat™ advanced format feature (4Kn and 512e). Advanced Write Caching helps ensure rapid response rates with a 20% boost in random write performance.<sup>1</sup>

## Best-Fit Applications

- Hyperscale applications/cloud data centers
- Massive scale-out data centers
- Big Data applications
- High-capacity density RAID storage
- Mainstream enterprise external storage arrays
- Distributed file systems, including Hadoop and Ceph
- Enterprise backup and restore—D2D, virtual tape
- Centralized surveillance

## Innovative Helium Design

The Exos X12 hard drive is built on a rock-solid sealed-drive design. A wrought-aluminum base and a helium sealed-drive design with no porosity and uniform density are designed with superior material and wide-weld design for a more robust, hermetically sealed-drive enclosure. Exos X12 hard drives incorporate digital environmental sensors for measuring pressure in the drive, helping to ensure high reliability, performance and quality.

## Enhanced Enterprise Reliability, Data Protection and Security

Seagate is the industry leader in data-at-rest protection with the broadest offering of technologies to help ensure reliable, trusted products. Seagate Secure™ models provide hardware-based security to help protect data-at-rest. With Instant Secure Erase, drive retirement is safe, affordable, fast and easy. Seagate Secure models meet the NIST 800-88 media sanitization specification and support the Trusted Computer Group (TCG) standard.<sup>2</sup> The X class Exos X12 hard drive is a proven, enterprise-class hard drive with maximum reliability backed by a 2.5 million hour MTBF.

<sup>1</sup> Compared to 8TB competitive product

<sup>2</sup> Seagate Secure models not available in all countries. May require TCG-compliant host or controller support.





Specifications		
Capacity	12TB	12Gb/s SAS
SATA Standard Model (512e)	ST12000NM0007	—
SATA SED Model (512e)	ST12000NM0017	—
SAS Standard Model FastFormat™ (512e/4Kn) <sup>1</sup>	—	ST12000NM0027
SAS SED Model FastFormat (512e/4Kn) <sup>1,2</sup>	—	ST12000NM0037
Features		
Superior Helium Sealed-Drive Design With Wide Weld	Yes	Yes
Digital Sensors for Helium Pressure	Yes	Yes
Protection Information (T10 DIF)	—	Yes
SuperParity	Yes	Yes
PowerChoice™/PowerBalance™ Technology	Yes	Yes
Seagate RAID Rebuild™	Yes	Yes
Low Halogen/Hot-Plug Support <sup>3</sup>	Yes	Yes
Cache, Multisegmented (MB)	256	256
Organic Solderability Preservative	Yes	Yes
Secure Download and Diagnostics (SD&D) RSA 2048 signed firmware	Yes	Yes
Reliability/Data Integrity		
Mean Time Between Failures (MTBF, hours)	2,500,000	2,500,000
Reliability Rating @ Full 24x7 Operation (AFR)	0.35%	0.35%
Nonrecoverable Read Errors per Bits Read	1 sector per 10E15	1 sector per 10E15
Power-On Hours per Year (24x7)	8760	8760
512e Sector Size (Bytes per Sector)	512	512, 520, 528
4Kn Sector Size (Bytes per Sector)	—	4096, 4160, 4224
Limited Warranty (years)	5	5
Performance		
Spindle Speed (RPM)	7200	7200
Interface Access Speed (Gb/s)	6.0, 3.0	12.0, 6.0, 3.0
Max. Sustained Transfer Rate OD (MB/s, MiB/s)	Up to 261, 249	Up to 261, 249
Random Read/Write 4K QD16 WCD (IOPS)	170/400	170/400
Interface Ports	Single	Dual
Rotation Vibration @ 20-1500 Hz (rad/sec <sup>2</sup> )	12.5	12.5
Power Consumption		
Idle A (W) Average	5.0W	5.4W
Average Latency (ms)	4.16	4.16
Operating Power <sup>4</sup>	7.8	9.3
Power Supply Requirements	+12 V and +5 V	+12 V and +5 V
Environmental		
Temperature, Operating (°C)	5°C – 60°C	5°C – 60°C
Vibration, Nonoperating: 10Hz to 500Hz (Grms)	2.27	2.27
Shock, Operating 2ms (Read/Write) (Gs)	70	70
Shock, Nonoperating 2ms (GS)	250	250
Physical		
Height (mm/in, max) <sup>5</sup>	26.11mm/1.028in	26.11mm/1.028in
Width (mm/in, max) <sup>5</sup>	101.85mm/4.010in	101.85mm/4.010in
Depth (mm/in, max) <sup>5</sup>	147.0mm/5.787in	147.0mm/5.787in
Weight (g/lb)	705g/1.554lb	705g/1.554lb
Carton Unit Quantity	20	20
Cartons per Pallet/Cartons per Layer	40 / 8	40 / 8

1 FastFormat models ship in 512e format state. When switching from 512e to 4Kn by executing the FastFormat routine, all data on the drive will be deleted. Note that data must be aligned to 4K sectors to see improved performance in 4Kn format.

2 Self-Encrypting Drives (SED) and FIPS 140-2 Validated drives are not available in all models or countries. May require TCG-compliant host or controller support.

3 Supports Hotplug operation per Serial ATA Revision 2.6 specification.

4 SATA Random 8K1Q 50% Write/50% Read WCD @ 40 IO/s, SAS Random 4K4Q 50% Write/50% Read WCD @ 165 IO/s

5 These base deck dimensions conform to the Small Form Factor Standard (SFF-8301) found at [www.sffcommittee.org](http://www.sffcommittee.org). For connector-related dimensions, see SFF-8323.

**seagate.com**



AMERICAS Seagate Technology LLC 10200 South De Anza Boulevard, Cupertino, California 95014, United States, 408-658-1000

ASIA/PACIFIC Seagate Singapore International Headquarters Pte. Ltd. 7000 Ang Mo Kio Avenue 5, Singapore 569877, 65-6485-3888

EUROPE, MIDDLE EAST AND AFRICA Seagate Technology SAS 16-18, rue du Dôme, 92100 Boulogne-Billancourt, France, 33 1-4186 10 00

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